What is claimed is:

1. An electrode used for a discharge lamp, comprising:

an electrode rod made of refractory metal; and

a winding element made of refractory metal wires that are wound around the electrode rod in a same turning direction and that forms *n* layers of coils, n being larger than one,

wherein a wire forming an *(m+1)*th layer is wound along a spiral valley between adjacent turns in a coil of an *m*th layer, *m* satisfying an inequality 0<m<n, an ordinal number given to each layer representing an order in which a coil of the layer has been formed.

2. The electrode of Claim 1,

wherein the wire forming the *(m+1)*th layer is wound to cover the spiral valley.

3. The electrode of Claim 2,

wherein all the refractory metal wires have a same diameter.

4. The electrode of Claim 1,

wherein at a discharge end of the winding element, the winding element is cut along a plane approximately perpendicular to a longitudinal direction of the electrode rod.

5. The electrode of Claim 4,

wherein each layer in the winding element contains an equal number of turns.

6. The electrode of Claim 1,

wherein at an opposite end to a discharge end of the winding element, the winding element is cut along a plane approximately perpendicular to a longitudinal direction of the electrode rod.

7. The electrode of Claim 6,

wherein at the opposite end, the winding element is fixed to the electrode rod.

8. The electrode of Claim 1,

wherein a refractory metal wire forming a first layer has a smaller diameter than a refractory metal wire forming a second layer and

wherein the refractory metal wire forming the second layer is wound to form spaces that are each surrounded by (a) adjacent turns in a coil of the first layer, (b) the electrode rod, and (c) the second layer.

9. The electrode of Claim 1,

wherein the *n* layers include a *(p-1)*th layer, a *p*th layer, and *(p+1)*th layer, which are formed by refractory metal wires with diameters of *P-1*, *P*, and *P+1* respectively,

p satisfying an inequality $1<p<n$, inequalities $P<P-1$ and $P<P+1$ being satisfied, and

wherein the three refractory metal wires are wound to form spaces that are each surrounded by (a) the $(p-1)$th layer (b) adjacent turns in a coil of the pth layer, and (c) the $(p+1)$th layer.

10. The electrode of Claim 1,

wherein a refractory metal wire forming an nth layer has a smaller diameter than a refractory metal wire forming an $(n-1)$th layer.

11. The electrode of Claim 1,

wherein at least refractory metal wires forming layers from a first layer to an $(n-1)$th layer have approximately circular cross-sectional shapes.

12. The electrode of Claim 1,

wherein a major constituent of the electrode rod and each refractory metal wire is tungsten.

13. A discharge lamp, comprising:

two electrodes; and

a light-emitting tube that includes (a) a light-emitting part containing a light-emitting space and (b) two sealing parts that each seal a different end of the light-emitting part, wherein the two electrodes extend from the

two sealing parts,

wherein the two electrodes each include:

an electrode rod made of refractory metal; and

a winding element made of refractory metal wires that are wound around the electrode rod in a same turning direction and that forms *n* layers of coils, n being larger than one,

wherein a wire forming an *(m+1)*th layer is wound along a spiral valley between adjacent turns in a coil of an *m*th layer, *m* satisfying an inequality 0<m<n, an ordinal number given to each layer representing an order in which a coil of the layer has been formed.

14. The discharge lamp of Claim 13,

wherein a length from a tip of one electrode to a tip of another electrode is 2.5 mm or shorter.

15. The discharge lamp of Claim 14,

wherein the length is 0.6 mm or longer.

16. A method for producing an electrode used for a discharge lamp, including:

a winding step for winding at least one refractory metal wire around a core member and forming *n* layers of coils one by one, *n* being larger than one;

a cutting step for cutting the formed *n* layers of coils and the core member;

a removing step for removing the core member after the cutting step;

a rod inserting step for inserting an electrode rod into a space from which the core member has been removed, the electrode rod being made of refractory metal; and

a fixing step for fixing the formed *n* layers of coils to the inserted electrode rod.

17. The method of Claim 16,

wherein in the winding step, a refractory metal wire forming an *(m+1)*th layer is wound along a spiral valley between adjacent turns in a coil of an *m*th layer, *m* satisfying an inequality 0<m<n, an ordinal number given to each layer representing order in which a coil of the layer has been formed and

wherein refractory metal wires forming the *(m+1)*th layer and the *m*th layer are wound in a same turning direction.

18. The method of Claim 16, further including

a shape stabilizing step for stabilizing a shape of the *n* number of layers of coils, wherein the shape stabilizing step is performed between the winding step and the cutting step.

19. The method of Claim 16,

wherein the removing step is performed by immersing

the core member, around which the *n* number of layers have been formed, into a liquid that dissolves the core member but does not dissolve each refractory metal wire.

20. The method of Claim 19,

wherein the core member is made of molybdenum, and each refractory metal wire is made of tungsten.

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